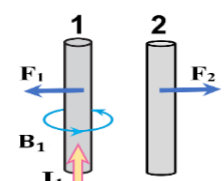
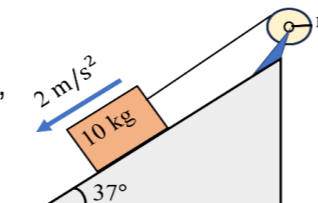
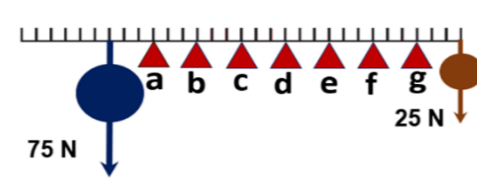
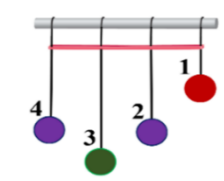
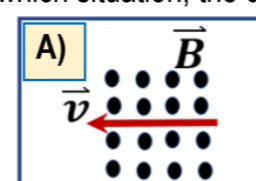
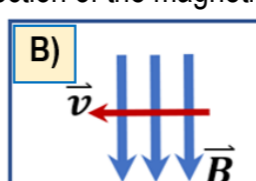
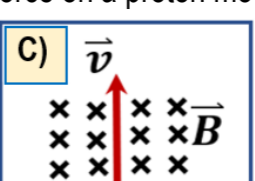
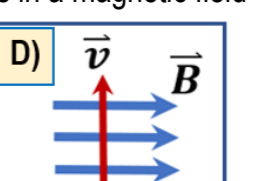




Choose the right answers for the following questions: (two marks for each question)

- The wheel on an upside-down bicycle moves through 10 rad in 2 s. What is the wheel's angular acceleration if its final angular speed is 8 rad/s? A) 3.5 rad/s<sup>2</sup> B) 3 rad/s<sup>2</sup> C) 6.3 rad/s<sup>2</sup> D) 8 rad/s<sup>2</sup>
  - How many radians are equal (128°)? A) 1.3 rad B) 2.23 rad C) 3.3 rad D) 3.2 rad
  - Which equation is correct to calculate centripetal acceleration?  
 A)  $a_c = r\omega^2$  B)  $a_c = r\omega$  C)  $a_c = r^2\omega$  D)  $a_c = \frac{\omega^2}{r}$
  - In figure (Two parallel wires, each carrying a direct current) Determine the direction of movement of electrons in the wire (2)?  
 A) out of the page. B) into the page.  
 C) down the page. D) up the page.
- 
- (A girl at a state fair swings a ball in a vertical circle at the end of a string) What is the tension force applied by the string at the bottom of the ball's path?  
 A) equals the weight of the ball. B) equals (weight of the ball + centripetal force that maintains circular motion)  
 C) smaller the weight of the ball. D) equals (weight of the ball - centripetal force that maintains circular motion)
  - (An object moves in circle at constant speed) Which of the following is not true for object?  
 A) centripetal acceleration is directed toward the center of the circle. B) tangential acceleration is zero.  
 C) centripetal force acts on it. D) The object in equilibrium.
  - A 10 kg mass is attached to a cord that is wrapped around a wheel with a radius of 10 cm, as shown in Figure. The acceleration of the mass down the frictionless incline is measured to be 2 m/s<sup>2</sup>. Assuming the axle of the wheel to be frictionless, determine the moment of inertia of the wheel?  
 A) 0.19 kg.m<sup>2</sup> B) 0.24 kg.m<sup>2</sup>  
 C) 40 kg.m<sup>2</sup> D) 0.05 kg.m<sup>2</sup>
- 
- A wave whose particles vibrate perpendicular to the direction of the wave is traveling:  
 A) transverse wave B) sound wave C) longitudinal wave D) (B and C) are correct
  - Identify which, conditions of equilibrium hold for (a bicycle parked against a curb)?  
 A) Only translational equilibrium. B) Only rotational equilibrium.  
 C) Both rotational and translational equilibrium. D) neither translational rotational nor rotational equilibrium.
  - At Which of the seven positions indicated in figure should the supporting pivot be located to produce a net negative torque?  
 A) (c,f) B) (f)  
 C) (b) D) (a)
- 
- Two uniformly solid cylinders of equal radii roll down an incline without slipping. The first cylinder has three times the mass of the second cylinder. The torque was exerted on the first cylinder is..... torque exerted on the second cylinder? A) twice B) three times C) four times D) five times
  - The unit of angular momentum is:  
 A)  $\frac{\text{kg} \cdot \text{m}^2}{\text{s}}$  B)  $\frac{\text{kg}^2 \cdot \text{m}^2}{\text{s}^2}$  C)  $\frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$  D)  $\frac{\text{kg}^2 \cdot \text{m}^2}{\text{s}}$

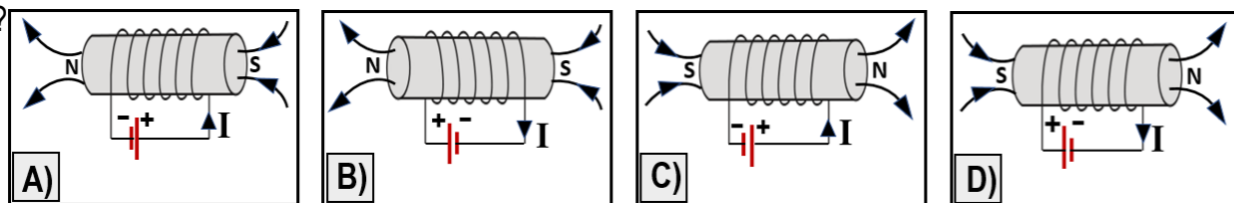
- Which of the following must be true for two waves with identical amplitudes and wavelengths to undergo complete destructive interference?  
 A) The waves must be in phase at all times. B) The waves must be 90° out of phase at all times.  
 C) The waves must be 180° out of phase at all times. D) The waves must be 270° out of phase at all times.
  - A disk rolls along a horizontal surface at a constant linear speed without slipping .What is the ratio of its translational kinetic energy to total kinetic energy ( $\frac{KE_{\text{translational}}}{KE_{\text{total}}}$ )? A)  $\frac{1}{2}$  B)  $\frac{2}{7}$  C)  $\frac{2}{3}$  D)  $\frac{1}{3}$
  - If the pendulum number (2) is set in motion. Which pendulum will oscillate with larger amplitude?  
 A) 1 B) 3  
 C) 4 D) (1 and 3)
- 
- How does the restoring force acting on a pendulum bob changes as the bob swings toward the equilibrium position? How do the bob's acceleration (along the direction of motion) and velocity change?  
 A) restoring force decreases, acceleration decreases, velocity increases  
 B) restoring force increases, acceleration decreases, velocity increases  
 C) restoring force decreases, acceleration increases, velocity increases  
 D) restoring force decreases, acceleration decreases, velocity decreases
  - Which solid has a valence band that overlaps the conduction band?  
 A) Insulator B) Semiconductor C) Conductor D) All answers are correct
  - Which of electromagnetic waves is used easily to measure Compton shift?  
 A) Visible light B) Microwaves C) Infrared rays D) X-ray
  - A simple pendulum of length 0.25 m and period of 1s what will be the period of this pendulum if its length is 1m at same place? A) 5 s B) 4 s C) 3 s D) 2 s
  - Two successive crests of a transverse wave are 2.4 m apart. Eight crests pass a give point in 12 s. What is the wave speed? A) 0.8 m/s B) 1.6 m/s C) 3.2 m/s D) 0.4 m/s
  - Which of the following wave lengths will not produce standing waves on a string that is 3.5 m, long?  
 A) 1.75 m B) 3.5 m C) 7 m D) 5 m
  - What is another word for "quantum of light"? A) Blackbody radiation B) energy level C) photon D) frequency
  - A bat flies towards a fixed wall and sends an ultrasonic wave of frequency (f), Which of the following equations is correct to calculate the apparent frequency (f') of this wave when it strikes the wall?  
 A)  $f' = f \frac{v}{v-v_s}$  B)  $f' = f \frac{v}{v+v_s}$  C)  $f' = f \frac{v+v_o}{v}$  D)  $f' = f \frac{v-v_o}{v}$
  - In which situation, the direction of the magnetic force on a proton moves in a magnetic field is out of the page?  
 A)  B)  C)  D) 
  - Which of the following represents the first three harmonics in a pipe closed at one end?  
 A) (50 Hz) , (100 Hz) , (150 Hz) B) (50 Hz) , (150 Hz) , (250 Hz)  
 C) (50 Hz) , (100 Hz) , (200 Hz) D) (50 Hz) , (150 Hz) , (450 Hz)
  - If the intensity of a sound is ( $1 \frac{\text{W}}{\text{m}^2}$ ) what is the relative intensity of this sound?  
 A) 0 dB B) 60 dB C) 120 dB D) 40 dB

27. A toaster is plugged into a source of alternating emf with an rms value of 110 V. The heating element is designed to convey a current with a maximum value of 10.5 A, The resistance of the heating element?  
**A) 1.78  $\Omega$**       **B) 7.42  $\Omega$**       **C) 0.707  $\Omega$**       **D) 14.8  $\Omega$**
28. Two currents run in opposite direction in two parallel wires A and B at a distance of 1m Apart. if the current  $I_A$  is a third of  $I_B$  ( $I_A = \frac{1}{3} I_B$ ) determine the position of the point along the line normal to the wires where the total magnetic field is zero?  
**A) 1 m away from wire A**      **B) 0.5 m away from wire A**  
**C) 0.75 m away from wire A**      **D) 0.05 m away from wire A**

29. A solenoid of length 50 cm has 2000 turns. Calculate the magnitude of the magnetic field in the middle of the solenoid when a current of 10 A passes through its turns: [ $\mu_0 = 4\pi \times 10^{-7} \text{ T.m/A}$ ]  
**A)  $5 \times 10^{-4} \text{ T}$**       **B)  $5 \times 10^{-3} \text{ T}$**       **C)  $5 \times 10^{-2} \text{ T}$**       **D)  $5 \times 10^{-1} \text{ T}$**

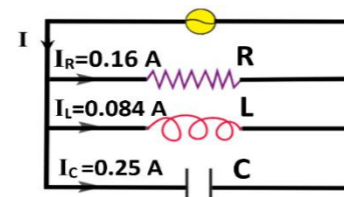
30. A generator coil has 25 turns of wire and a cross-sectional area of 36 cm<sup>2</sup>. The maximum emf developed in the generator is 2.8 V at 60 Hz. what is the strength of the magnetic field in which the coil rotates?  
**A)  $8.25 \times 10^{-3} \text{ T}$**       **B)  $8.25 \times 10^{-2} \text{ T}$**       **C)  $8.25 \times 10^{-5} \text{ T}$**       **D)  $8.25 \times 10^{-4} \text{ T}$**

31. According to right hand rule, which of following figures correctly describe the direction of current and magnetic field of solenoid?



32. Eddy currents are used:  
**A) In furnaces**      **B) In car brake systems**  
**C) In detecting metals in airports underground**      **D) In all of them**

33. In the electrical circuit is in the adjacent figure Calculate the Phase difference angle between the total current and the total potential difference?  
**A) 13.5°**      **B) 35°**  
**C) 46°**      **D) 90°**



34. A source of frequency  $\frac{100}{\pi}$  Hz and its effective potential difference is 200 V is connected across a capacitor, if the effective current of the circuit is 10 A, Calculate the maximum charge accumulated across the capacitor?  
**A)  $5.65 \times 10^{-2} \text{ C}$**       **B)  $5 \times 10^{-2} \text{ C}$**       **C)  $7.07 \times 10^{-2} \text{ C}$**       **D)  $14.1 \times 10^{-2} \text{ C}$**

35. Commutator is not used in: **A) D.C generator**      **B) D.C motor**      **C) A.C generator**      **D) both (A and B) are correct**

36. A potential difference of 0.75 V is needed to provide a large current for arc welding. If the potential difference across the primary of a step-down transformer is 117 V, what is the ratio of the number of turns of wire on the primary to the number of turns on the secondary?  
**A)  $\frac{1}{156}$**       **B)  $\frac{156}{1}$**       **C)  $\frac{171}{1}$**       **D)  $\frac{1}{171}$**

37. Which of the following frequencies the emission of electrons from a meatal surface of a work function is (2.3 eV) occurs when light shines on the surface of the meatal? [ $h = 6.63 \times 10^{-34} \text{ J.s}$ ]  
**A)  $5.8 \times 10^{14} \text{ Hz}$**       **B)  $6.8 \times 10^{14} \text{ Hz}$**       **C)  $5.8 \times 10^{13} \text{ Hz}$**       **D) (A and B) are true**

38. In which of the following cases super conductor materials couldn't be used:  
**A) as heating device and ovens.**      **B) a transferring energy with no losses.**  
**C) as storage of electrical energy.**      **D) magnetic levitation.**

39. In the transistor outer regions are called the (emitter and collector) and the narrow central region is called the base which of the following is true:  
**A) The emitter is more heavily doped than the base.**      **B) The (emitter - base) junction is forward biased.**  
**C) The (base - collector) junction is reverse biased.**      **D) All answers are correct.**

40. (In the photoelectric effect, if the frequency of incident light is increased with same intensity) Which of the following is true? **A) The speed of emitted electrons increases.**      **B) The kinetic energy of ejected electrons increases.**  
**C) The number of emitted electrons does not change**      **D) All answers are correct**

41. A simple pendulum can be used as an altimeter on a plane. What will happened as the plane rises from the ground to its final cruising altitude of 10<sup>4</sup> m? **A) Its period will increase**      **B) Its frequency will increase**  
**C) Its frequency will decrease**      **D) (A and C) are correct**

42. Which of the following summarizes Thomson's model of the atom?  
**A) Atoms are hard, uniform, indestructible spheres.**  
**B) Electrons are embedded in a sphere of positive charge.**  
**C) Electrons orbit the nucleus in the same way that planets orbit the sun.**  
**D) Electrons exist only at discrete energy levels.**

43. In the region of which of following waves are (Masers) working?  
**A) Microwave**      **B) X-ray**      **C) Ultraviolet wave**      **D) Gamma ray**

44. According to..... principle, any points on the wave front of light can be treated as a new point source of light to produce a new wave. **A) Oersted's**      **B) Bohr's**      **C) Huygens's**      **D) Planck's**

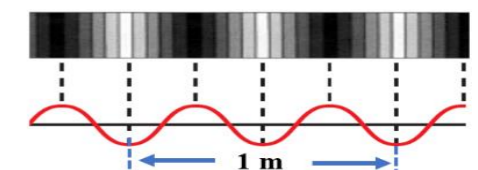
45. What is the magnitude of the magnetic force ( $F_{\text{magnetic}}$ ) on the electron, when moving perpendicular into the magnetic field ( $\vec{B}$ )? **A)  $(qvB)$**       **B)  $(-B\ell v)$**       **C)  $(B\ell v)$**       **D)  $(\frac{q}{vB})$**

46. A double slit interference experiment is performed using blue light from a hydrogen discharge tube ( $\lambda = 486 \text{ nm}$ ) The fifth order bright fringe in the interference pattern is 0.578<sup>o</sup> from the central maximum. How far apart are the two slits separated? **A)  $7.5 \times 10^{-4} \text{ m}$**       **B)  $2.41 \times 10^{-4} \text{ m}$**       **C)  $6.3 \times 10^{-6} \text{ m}$**       **D)  $5.66 \times 10^{-4} \text{ m}$**

47. A car of mass 1000 kg moves in circular truck at constant speed of 25 m/s if the circumference of track is 6280 m , calculate the force that maintains circular motion of car?  
**A) 1000 N**      **B) 625 N**      **C) 2140 N**      **D) 4280 N**

48. The electrical energy is transferred from power plants to houses and factories  
**A) By high potential difference and low current.**      **B) By low potential difference and high current.**  
**C) By high potential difference and high current.**      **D) By low potential difference and low current.**

49. What is the wavelength of the sound wave shown in the figure?  
**A) 1 m**      **B) 0.75**  
**C) 0.5 m**      **D) 0.25 m**



50. If the expressions of the instantaneous current and instantaneous potential difference across a pure self-inductance given by  $I_L = 2\sqrt{2}\sin(100\pi t)$  ,  $V_L = 125.6\sqrt{2}\sin(100\pi t + \frac{\pi}{2})$  calculate the coefficient of self induction of coil?  
**A) 0.2 H**      **B) 0.5 H**      **C) 0.75 H**      **D) 0.62 H**